nected properly and that the voltage switch is correctly set for the battery being charged.

Press the LOW charge rate button to initiate charging and then adjust the charge rate to the required level.

If the charger switches off during charging then an overload has been detected. Reduce the charge rate to the next lower setting to restore the charger output.

F. DISCONNECTING THE CHARGER

When you have completed your charging programme.

1. Press the OFF switch down.
2. Remove the charger plug from the AC mains socket.
3. Remove the charger clips from the battery.

G. RECOMMENDED CHARGING RATES

The recommended charging rate for most batteries is 10% of rated capacity. This means that a 50 ampere-hour battery would normally be charged at 5 amps for 10 hours.

In practice, batteries will have some residual charge and will vary in age, condition and internal resistance. The above chart is provided as a guide only. For accurate charge times use the ammeter reading at the selected setting and the ampere hour capacity of the actual battery and calculate the time from the following formula:

Charge Time =

$$\frac{\text{Ampere Hour capacity of battery (Ah)}}{\text{Ammeter Reading (Amps)}}$$

for example:

$$\frac{\text{75 Ah battery}}{\text{5A Meter reading}} = \text{15 hours charge time}$$

Occasionally it may be necessary to charge at a higher current in order to reduce the charging time. Under these circumstances it is vital that charging times are not exceeded otherwise the battery may be damaged.

In view of the high currents involved we strongly recommend that for small 12V batteries the charging times calculated are halved whenever there is doubt about the condition of the battery to be charged. Charging may be completed at the Low rate as necessary.

Motorcycle Batteries

Since motorcycle batteries are small we do not recommend charging them with this battery charger without the use of an external current limiter.

A 12V, 12 watt tail lamp bulb connected in series with the battery and one of the charger output leads would act as a satisfactory current limiter when the charge rate is set to LOW.

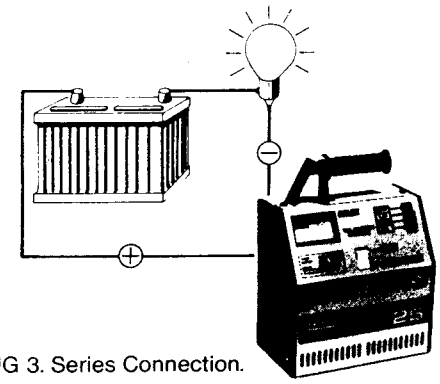

FIG 3. Series Connection.

H. BANK CHARGING

Several batteries having the same voltage rating may be charged simultaneously by connecting them in parallel with the charger using separate jumper leads for the purpose (see illustration).

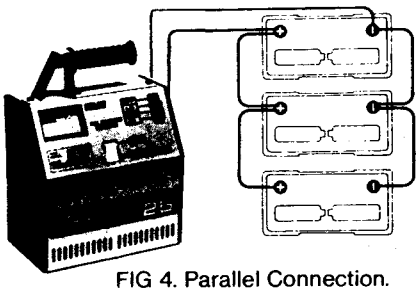

FIG 4. Parallel Connection.

before attaching the charger output leads.

5. Always charge batteries in a well ventilated area remote from inflammable liquids and gases. Fully charged batteries bubble freely and emit hydrogen gas which is highly inflammable. Do not approach the charging area, or attempt to examine batteries, with a naked flame.

C. CONNECTING THE CHARGER TO A BATTERY

The output leads are fitted with battery clips and coloured for easy identification of polarity.

Red lead for Positive (+) battery terminal.

Black lead for Negative (-) battery terminal.

Connect the clips to the battery terminals making sure that they bite firmly and that polarity is correct.

D. PREPARING TO CHARGE A BATTERY

1. Press the OFF switch down.
2. Plug the charger into a 240V mains power point.
3. Press down the 12V or 24V switch according to the voltage of the battery to be charged.
4. Select the required charging rate (Low, Medium or High) by pressing down the appropriate switch. This will cause the OFF switch to disengage and switch the charger on.
5. Check the charge rate indicated by the ammeter.

Note: Refer to Section G. for recommended charging rates.

THE AMMETER

The charge rate meter is scaled in amps and colour zoned to indicate various operating conditions.

Continuous Charge

The charger may be operated continuously when the needle lies in the green band.

Intermittent Charge

Used for short term boost charging. Band coloured yellow.

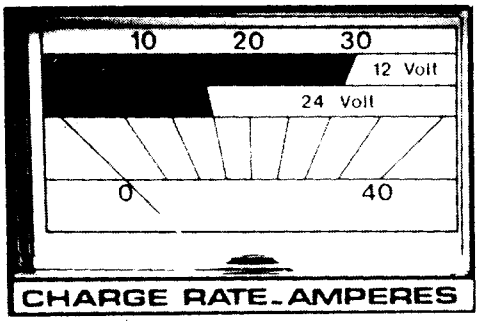

FIG 2. The Ammeter.

E. SHOULD YOUR CHARGER FAIL TO OPERATE

Check that you have the battery con-

GUIDE TO CHARGING TIMES (Refer to G)

12 Volt / Vehicles	Battery capacity (Approx.)	Charge Rate		
		Low	Medium	High
Small cars	30-45 Amp.Hours	4-9 hours	2-4 hours	15 min. max.
Large cars and boats	50-95 Amp.Hours	10-20 hours	4-9 hours	1-2 hours
Light and medium trucks and tractors	100-200 Amp.Hours	20-40 hours	9-18 hours	3-7 hours
24 Volt / Trucks & Tractors	60-110 Amp.Hours	20-40 hours	10-20 hours	5-10 hours
Large trucks, large implements	120-200 Amp.Hours	40-100 hours	20-40 hours	10-20 hours

NB: The longer time refers to the larger capacity battery.

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BATTERY CHARGER 25

Please read these instructions carefully before operating your new battery charger.

Charger 25 is a high powered, portable unit designed to charge 12 and 24 volt automotive batteries. It will charge small, medium or large capacity batteries either singly or in banks and provides a choice of three separate charging rates nominated **Hi** (High), **Med** (Medium) and **Lo** (Low).

A. CONTROLS

The controls are mounted on the top panel of the charger and consist of:

1. A 40 amp moving coil ammeter.
2. Voltage selector switch for 12 and 24 volt batteries.
3. A bank of four push button switches for selecting low, medium and high charging rates and charger **OFF.**

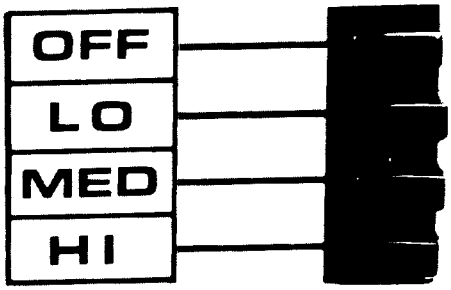

FIG 1. Pushbutton Switches.

To select the required function simply push down the appropriate switch button.

B. PROTECTION

The charger is protected from damage by two independent systems —

(1) Electronic,

(2) Thermal.

1. The electronic system assesses the charger's operating conditions and switches it off if it senses that:
   (a) A short circuit or overload exists.
   (b) The battery has been connected in reverse polarity.
   (c) The charger controls are incorrectly set for the battery under charge.
   Like a miniature computer, the electronic system evaluates the battery connected to the charger and also its own switch settings **before** switching the charger ON.
2. A temperature sensitive circuit breaker guards the transformer against sustained overloading. It is fully automatic and if activated will reset itself after a cooling down period of around 10 minutes.

WARNING

1. Observe all instructions specified by the vehicle manufacturer.
2. Ensure that the charger is switched OFF before connecting it to, or disconnecting it from, a battery or bank of batteries.
3. Remove the battery filler caps and check the level of the electrolyte in the cells. If necessary, top up with distilled water so that the electrolyte is 6 mm (¼") above the top of the plates. Do not replace the filler caps until the charging programme has been completed.
4. When charging a battery in a vehicle fitted with an alternator, disconnect the vehicle positive-lead from the battery

Charging time is calculated by adding the individual capacities (Ampere hours) of the batteries in the bank and dividing this sum by the charging rate selected. for example:
3 batteries are rated —

$$50Ah + 60Ah + 80Ah$$

$$= \frac{190Ah \text{ total capacity}}{10A \text{ meter reading}}$$

$$= 19 \text{ hours charge time}$$

Where one or more batteries of small capacity (less than 40 Ah) are included in the bank, only Low charging rates should be used.

I. LOW MAINTENANCE BATTERIES

The characteristics of low maintenance batteries are somewhat different from those of ordinary lead acid batteries.
Depending on its state of discharge, the low maintenance battery may not register a significant charging current on the charger ammeter when first connected.
However, as the charge progresses,the ammeter will start to indicate an increasing charge rate which will eventually reach a maximum. Usually this only takes a few minutes and is called the stabilisation period. Then, as with ordinary batteries, the ammeter reading will decrease as the battery approaches the fully charged condition.
When fully charged, the low maintenance battery does not gas so noticeably as ordinary batteries. Nevertheless, the usual safety precautions should still be observed.

CAUTION

Particular care must be taken when recharging the **sealed** type of low maintenance batteries. These are easily recognised as they do not have removeable filler caps.
Carefully calculate the charging time required. (Refer to the section G headed "Recommended Charging Rates".)
Now charge the battery for half the calculated charging time. This will make allowance for any residual charge held by the battery and should provide more than sufficient power to start the vehicle engine.

J. CABLE STORAGE

When carrying or storing the charger simply loop the cables around the stem of the carrying handle.

SPECIFICATIONS

- On/off power switch
- 12 volt and 24 volt outputs
- Variable charging rates:—

BATTERY	CONTINUOUS			INT
	LOW	MED	HIGH	SURGE
12V	6A	12A	24A	40A
24V	3A	6A	12A	20A

- Accurate 40A moving coil ammeter
- Solid state silicon rectification
- Electronic protection circuit.(Automatic)
- Thermal overload circuit breaker. (Automatic)
- Heavy gauge steel case zinc sealed and colour bonded for corrosion resistance
- 100 Amp plier-grip battery clips
- Dimensions 290 x 165 x 385 mm
- Weight 16.5 Kg

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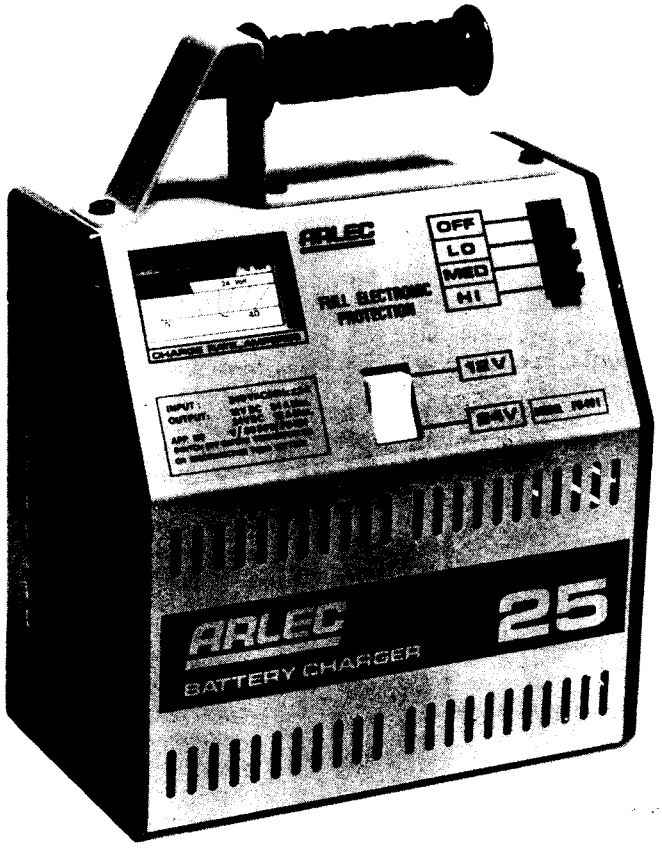
BATTERY CHARGER 25



OPERATING INSTRUCTIONS